



**NOAA Teacher at Sea  
Elizabeth Martz  
Onboard NOAA Ship ALBATROSS IV  
August 5 – 16, 2007**

**NOAA Teacher at Sea: Elizabeth Martz**

NOAA ship ALBATROSS IV

Mission: Sea Scallop Survey

Date: August 6, 2007

Woods Hole, MA

**Science and Technology Logs**

7:15 a.m.—Breakfast. I met many scientists, crew, teachers, officers, & more... details about Sea Scallop Leg III will occur at 10 am. Awesome food for breakfast.

8:30 a.m.—Free time in the town. I saw the countryside, the marina, & visited the town of Wood's Hole.

10:00 a.m.—Albatross IV information. We had a scientist's meeting for all watch shifts. (I am on the 12 a.m. (midnight) -12 p.m. (noon) watch.) We discussed expectations, responsibilities, and ideas about this

adventure/experience. We were informed of sexual harassment, drug possession rules, and other NOAA policies. I clearly understood my expectations and responsibilities.



**Wood's Hole is an amazing place of nature, water, and other environmental benefits. Notice how many boats & people benefit from the water.**

10:00 a.m.—Albatross information. The ALBATROSS IV is 187 feet in length, 38 feet in width. The major reason that the ALBATROSS IV is out to sea is to learn more about the sea scallop population. We sample for sea scallops from Virginia to Eastern Georges Bank (off the coast of Nova Scotia). This is the Leg III of the Sea Scallop study. We will be surveying sea scallops from Northern part of Georges Bank that borders on the Gulf of Maine to the Great South Channel east of Massachusetts. The dredge is towed for 15

minutes at a speed of 3.8 knots. The dredge covers about 1.0 nautical miles of ocean bottom. A nautical mile is compared to 1.15 land mile.

**Questions for the Day** (I am always thinking about how my students can benefit from my experiences!)

1. How many students in my class have been to the ocean?
2. How many students in my class have touched an aquatic or marine organism?
3. How many students can name 10 different aquatic organisms?
4. How many students have been on a large ship or cruise ship?

### **Information about the ALBATROSS IV**

Details about sorting the dredge haul:



**This sea a scallop was collected during a night dredge onboard the ALBATROSS IV on 8/9/07.**

1. Sea scallops are collected, measured, and weighed. This scallop is upside down. The top of a scallop is more convex (curves out) and the bottom of a scallop is more flat. Do you see how the convex side (the top of the sea scallop) fits nicely in your hand? The white area you see is the male gonad of the sea scallop. The fleshy, white section that a customer eats is found deeper inside the sea scallop.

2. All the diverse organisms we find in the dredge are collected in blue buckets. Each organism is sorted by type and measured individually by a researcher. Many studies are being conducted onboard the ALBATROSS IV. Some of the studies include: sea scallop shell analysis for age, sea scallop size analysis, sea scallop health analysis, human health when consuming sea scallops, skate analysis, populations of starfish and crabs, water characteristics are analyzed, and so much more.

3. The focus of the ALBATROSS IV's voyage is to count the number of sea scallops from each dredge. The



**Shawn McPhee & Adrienne Heim are measuring scallops. Over 350 scallops were collected on one dredge haul.**

scientists also collect fish, skates, and other unique organisms at each station. The fish include American plaice flounder, Atlantic Hagfish, fourspot flounder, goosefish,



**We collected this many sea scallops from one dredge. It is outstanding how many scallops live in one area of the Atlantic Ocean. I counted and learned details about scallops.**

longhorn sculpin, northern sand lance, ocean pout, red hake, sea raven, windowpane flounder, winter flounder, yellowtail flounder, and more. The skates include barndoor skate, little skate, winter skate, smooth skate, and more. Unique organisms include octopus, squid, and lobsters.

4. *If* there are more scallops than we can sort or measure, we conduct a subsample. A subsample is when you choose a smaller amount to measure and expand by

volume. For example, if you have 10 baskets of scallops, you choose 5 to measure and your expansion is two.

5. Orange baskets hold “habitat”. Abiotic habitat items include rocks, boulders, gravel, sand, and shells. Biotic habitat items include: brittle stars, shrimp, sand dollars, clams, and spider crabs. All of these biotic and abiotic items are counted and documented for each station.

6. The number of crabs and starfish is calculated every third station.

7. The CTD (Conductivity = salinity; Temperature; Depth)



**This is the standard dredge used on the ALBATROSS IV. This dredge is extremely important in collecting sea scallops from the ocean.**

is collected every fourth station. The CTD shows the details of the water column and helps determine where scallops are found.

8. The dredge is equipped with an inclinometer. This equipment is a sensor that measures dredge angle relative to the bottom of the ocean floor. The sensor has an internal clock that allows us to determine the amount of time that the dredge is on the bottom and in fishing position.

### **Good Questions for My Students**

1. If you know the average speed (V) of the vessel during that time (T) you can calculate the distance that the dredge travelled. The students can use the equation : Distance = Velocity x Time
2. Would you be a researcher out at sea(on the ocean)? If you had the chance to investigate the number of sea scallops in an area of the Atlantic Ocean, would you go?
3. Why are research vessels, like the ALBATROSS IV, so important for the study of science?

### **ALBATROSS IV Topics of Investigation**

1. Sea Scallop study and investigation.
2. FDA sea scallop study. The FDA is dissecting and analyzing the health of the sea scallops. The sea scallop gonads and viscera are being tested for hazardous toxins: a marine biotoxin called saxitoxin. It causes PSP: Paralytic Shellfish Poisoning. The sea scallop is unharmed because saxitoxin is part of their diet. The sea scallops are filter-feeders. The saxitoxin is produced by a dinoflagellate called Alexandrium Species. Saxitoxin is a neuron toxin that affects your nervous system. It specifically causes concerns in the nervous system where your breathing and muscle movement is controlled. If saxitoxin is consumed by a person, the affected person can be incubated (a tube is placed down your throat and air is forced into your lungs), then you will be fine. If you do not seek medical attention, you will have major difficulty breathing and the person will have concerns with their nervous system (all other functions). Not good!!

### **A Tour of the ALBATROSS IV**

There are 3 outside wet work stations, inside dry station, CTD station, Watch Chief station, and more!

There is a galley, Researcher work areas, hurricane deck, computer room, Officer's staterooms, our living quarters, exercise room, "the bridge", and other areas that I will discover throughout the boat.

There are 14 scientists onboard this vessel. I am one of those scientists. It has been stated that the research collected would not be possible without the help of volunteers. Very cool. I feel like I am an important part of this journey out to sea.

Important fact: When I am on watch: It is so important to take everything with me! Do not go back to the room. Be sure to have your computer, notes, change of clothes, and more. Be prepared.

All stations (randomly picked sites) give scientists about the sea scallop population and details about their survival.

Victor has a map posted in the dry lab. It is awesome. It is really, really cool and neat.

Victor stated over and over again!!!! ASK QUESTIONS!

### **Questions I Have**

1. What is the basic sea scallop population in the Atlantic Ocean?
2. How do the populations change from one site to another? The distribution is relative to depth, latitude, bottom type, and temperature/ salinity! If we go to an area more shallow we will not locate as many sea scallops.
3. Why does the population change over several years in the same area? Recruitment is a factor. This means that baby scallops larvae will settle in an area and they will grow.
4. In what water depth can you find the most sea scallops? Why?
5. What environmental conditions are best for sea scallop survival?
6. In what other areas of the world are sea scallops present and prevalent?
7. What helps the sea scallops survive?

### **Drills**

Fire/ collision drill: bring life vest and emergence suit; go to the wet lab and listen for announcements

Abandon ship drill: 7 short sounds and one long sound ; bring life vest, emergent suit, long sleeve shirt, long pants, and go to raft #6

Man overboard: go to lookout area and point the entire time!

### **Other Announcements**

Always report concerns! Be vocal when you have a problem and let's solve it. Please don't keep it inside and cause you concern... share what you feel.

This Sea Scallop survey has viewed, documented, and calculated organism counts in over 500 stations. The Sea Scallop survey is analyzing information about the location of sea scallops, the growth of sea scallops, and so much more. The Chief Scientist, Victor Nordahl, would love to use this information about sea scallops to begin more studies about the ecosystem. He stated “The sea scallop information is an excellent start to understanding the entire make-up of the ecosystem where the scallops are found. If we discover more about where we find the sea scallops, then we can help the sea scallops and more organisms survive.

The ALBATROSS IV may be retired soon. The boat has experienced and investigated numerous events. The vessel is beginning to show wear and tear. It has equipment that shows age and needs repair. Each boat needs to stay in compliance with NOAA standards and the ALBATROSS IV continues to make repairs to keep up with those standards.

The major goal of a research vessel is to collect accurate and reliable data. When an old ship is retired (no longer used to collect scientific information), then scientists need to compare the equipment on the old ship with the equipment on the new ship. This is called calibration. The new ship will use information from the old ship for at least one year. The data needs to be compared and analyzed because all data is used for long-term studies. If one ship makes scientific conclusions and another ship makes conclusions that are totally different from the first ship, then the data is not valid. The data could not be used and the scientists work would be a waste. So, NOAA and other research companies who collect scientific data need to make sure that their research procedures are accurate and reliable.

We will actually collect information about the sea scallop population using 2 different nets. The information will be analyzed and conclusions will be calculated about the reliability of the different dredges. The research outcomes will allow scientists to determine how the dredges and nets are different. The scientists will calculate the differences between the equipment and make a calibration. Neat stuff.

10:45 a.m.—Tour of Marine Biological Lab. Bill Kramer, an information technology scientist for NOAA, gave us a tour MBL (Marine Biological Laboratory). We learned about the marine environment and observed animals in the aquariums.

12:20 p.m.—Lunch. Excellent selection and many healthy choices. Great food.

1:20 p.m.-12:30 a.m.—ALBATROSS IV needs a special type of fuel/oil. We had free time. I explored Wood’s Hole on 8/6/06, so I took the ferry to Oak Bluff! It was

outstanding. I did get caught in an enormous rain storm, but I made it safely to Wood's Hole. I am so honored to be a part of the NOAA crew and I look forward to my adventure! I had the chance that night to speak to many other volunteers. We stayed up and talked all evening about our ideas and hopes for this trip. We are all excited and motivated to be a part of the crew of the ALBATROSS IV!!

I am very enthusiastically anticipating what I am going to do and what I will learn.

1. Will I personally collect sea scallops? I think so!
2. Will I see other marine organisms? Whales? Dolphins? Fish? Birds? I hope!!
3. How can I share with my students what I learned from this experience? Pictures, lessons, stories, and interviews
4. How will I organize all the information I learn so that my students have a better understanding about being a researcher? Computer documents and more
5. How can I document everything I see and do using my digital camera? Take 1,000 pictures
6. How can I motivate my students to be life-long learners? Smile and share stories of my adventures at sea!
7. How many of my students participate in fun summer activities involving science? I do hope that many students get involved in science camps and more. After I return, I plan to share stories and I hope this motivates them to attend science events!!
8. Why should students want to be scientists and researchers? I think it is obvious!! Science rules!!!
9. How will I help the marine organisms survive or how will I make a difference in the lives of others who study marine life? Be happy!
10. I am so excited and I am ready!